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Extension - 214

via facsimile and confirmation copy

Responsive to the first Written Opinion drawn up by the International Preliminary Examining Authority (IPEA) dated 05 April 2004.

A new set of claims is submitted. The amended claims 1, 3-12 are supported by the description. No new matter has been added.

IPEA indicates documents relevant for the examination of the present application. Documents D1 to D8 are listed below and shall be discussed in the following:

D1: Stocco DM, Molecular Endocrinology 2001, 15: 1245-1254

D2: Kallen et al., Molecular Cellular Endocrinology 1998, 145: 39-45

D3: Caron et al., Proceedings National Academy of Science USA 1997, 94: 11540-11545

D4: WO01/32920

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D5: WO00/66728

D6: Kimoto et al., Endocrinology 2001, 142: 3578-3589

D7: WO99/52519

D8: US5556847

The diagnostic and prognostic methods are related to samples which have been taken, which have been obtained from a subject and which comprising for instance body fluid or cells. Said samples are considered to be isolated (described in the instant invention on page 9) and thus, removed from their natural state and location in the human/animal body. The wording "in a subject" is rather meant to refer to results of the above methods as far as they relate to a disease afflicting a subject, that is to say, said disease being "in" a subject. The intention of the present invention to practice the methods as set forth in all of claims 1 to 12 *ex corpore* has been put forward in the description of the invention (please refer to page 12, 2nd paragraph). Thus, the methods according to all of claims 1 to 12 do not involve in-vivo methods on the human body or within the human body. To further affirm that the methods of the instant invention as filed are related to samples which have been taken, which have been obtained from a subject (please refer to page 11 of the present invention), the wording "obtained" was introduced into claim 1, 3 and 12.

Item V –

Point 4. The IPEA notes that the claims allegedly do not comply with Art. 6 and rule 6.3(a) PCT.

4.1 - All of claims 1, 3-12 are amended in such a way as to further phrase the gene and protein in question by incorporating the term "steroidogenic acute regulatory protein" instead of the abbreviation "StAR" which is supported throughout the specification as filed. On pages 5 (last paragraph) and 11 (3rd paragraph) of the description of the present invention it is pre-

cisely defined that said StAR gene is "the gene coding for the steroidogenic acute regulatory protein (StAR)".

4.2 – In order to provide clearity what is meant by using the phrase "fragment, derivative, variant", it is pointed to pages 7 and 8 of the instant invention as filed, where precise definitions of each of the wordings "fragment", "derivative" and "variant" are given.

4.4 – In the following the formulation "reference value" is further explained.
A "reference value" indicates a range or distribution of a measurement of a certain parameter value in a population which has been selected for either the presence or the absence of the disease in question. Thus, a "reference value" represents a "level" and/or an "activity" of a transcription and/or a translation product of the gene coding for "steroidogenic acute regulatory protein (StAR gene)" which is representative and indicative for a known health or disease status and to which an individual "level" and/or "activity" of a transcription and/or a translation product of the gene coding for "steroidogenic acute regulatory protein" in a sample obtained from a subject can be compared. The "reference" may be either "healthy control individuals or healthy control subjects or normal control individual", which, in the present invention, is used tantamount to the term "reference" on pages 5, 24 (Figure legend 1, 2 and 3), 25 (Table 1, 2) and 26 (Example I), and it is commonly known in the art that the value obtained from analyzing a "reference" is the "reference value". The "reference value" may be obtained as well from values of a level and/or activity in a sample from a subject suffering from a neurodegenerative disease. As an example, reference values obtained from the reference (here control subjects) of the present invention are shown in Table 1.

4.5 – To address the question whether the scope of the claims is extended to methods, to tests on cells within humans, it is referred to the explanations as given above (Item III). On page 12, 2nd paragraph, the description clearly indicates that the methods of the instant invention relate to samples (cells) removed, collected or isolated from a subject. The same holds true with cell-based and "in-vivo" assays. Here the assays are called "in-vivo" because the cells itself, which were collected from a subject, are living cells in a cell culture. The expression "in-vivo" as used in the present invention rather points to assays which are not absolutely of biochemical and/or biophysical nature.

4.6 – The wording "test animal" was defined on page 20, 2nd paragraph of the present invention, "... said test animal and/or said control animal is a recombinant, non-human animal which expresses the StAR gene ...". Thus, said test animals do not comprise humans.

In accordance with the suggestion of the IPEA to define the kit, claim 3, in terms of technical features as written in **Point 4, 4.7** of the opinion, claim 3 was amended resulting in the new amended claim 3.

Item V –

In the following, D1 to D8 as cited by the IPEA (and listed above) are discussed. The cited documents, without exception, are clearly different from subject matter of the instant invention and they either teach away from the current invention or discourage a person skilled in the art to deal with subject matter of the present invention as filed.

According to **section V 1.** of the first Written Opinion, claims 4, 5 and 9 to 12 allegedly are not novel in the sense of (Art. 33(2) PCT) regarding **D1-D5**.

1.1 - D1 discloses that StAR expression can be regulated by agents that presumably act on its promotor. The authors of D1 mention several studies which have been performed on transcription factors and on trans-acting proteins which after binding activate the StAR promotor. It is common knowledge in the art that every gene has a promotor, which after binding of certain elements of the cell, is activated and regulates the expression of the gene. These are naturally regulators of a living system. Considering this natural biological fact, no modulation at all of any substance within a cell would be novel.

1.2 - D3 and **D4** are cited of being allegedly relevant against novelty of claim 5. The authors of D3 created a StAR knock-out mouse. Said animal model offers clues to the human disorder 'congenital lipoid adrenal hyperplasia' by showing adrenocortical insufficiency. Said knock-out mouse is completely different from the recombinant transgenic animal showing symptoms of a neurodegenerative disease as disclosed in the instant invention. The same holds true for the genetically modified non-human animal as disclosed in D4, which is an animal model for a disease called 'endomtriosis' showing diseased endometrium tissue and no symptoms of a neurodegenerative disease.

1.3 - D5 allegedly being anticipating novelty of claim 9.
The applicants would like to draw the Examiner's attention upon that D5 refers to a protein, called StAR-B, which is homologous to steroidogenic acute regulatory proteins on its C-terminal end only (please refer to page 4 of D5). The overall sequence and protein of said StAR-B is completely different compared to the sequence and protein of the present invention as filed (please refer to page 10 of D5). Therefore, the subject matter of claim 9 is novel as it refers to another gene and protein.

1.4 – Amended claims 10 and 11 address the respective objection.

1.5 –D3 discloses the use of an antibody specific for the StAR protein in an immunoblot analysis. The authors of D3 used whole tissue extracts which were blotted and a signal either detected or not. Whereas claim 12 of the present application discloses the use of an antibody against StAR to stain a cell or cells obtained from diseased subjects and from healthy individuals, respectively, and detect specific staining patterns and compare those staining patterns with each other. Thus, the signals won't be either just present or absent, in each case you will get a signal, the pattern of the signals obtained may differ from each other. That's substantially different from the method as disclosed in D3 and therefore, the it is believed that claim 12 is new vis-a-vis D3.

According to **section V 2.**, of the first Written Opinion claims 1-3 appear to be in conflict with the concept of inventiveness (Art. 33(3) PCT) in view of **D3, D6 to D8**.

2.1 –D7 discloses that the NMDA-receptor can be alleviated by a compound and provides a method for treating Alzheimer's disease. And indeed, **D8** relates to the enhancement of memory in patients suffering from Alzheimer's disease by steroid sulfatase inhibitors in combination with the naturally occurring pregnenolone sulfate (PREGS).
It is common knowledge in the art that neurosteroids and sulfated neurosteroids have some effects on memory. It is discussed that these effects are due to the inhibition of GABA receptors and the facilitation of NMDA receptors (**D6**). There are more than 10 neurosteroids known. There are several signal transduction cascades initiated by the NMDA receptor and the GABA receptors, regulating hundreds of molecules which one could speculate to be all linked to neuroprotection. A great many proteins are involved in the biosynthetic pathway of cholesterol, the cholesterol transport and the synthesis of neurosteroids. Said signal transduction cascades

of the brain belong to the most complicated systems at all. Thousands of scientists are working in that field over several years and still, it is not fully known to date how the systems are linked and how the components are functioning and additionally, a lot of controversial data are published. Thus, it is not obvious at all to disclose StAR as a marker to diagnose Alzheimer's disease. StAR is a molecule which transports cholesterol through the mitochondrial membrane. It has a function which is far upstream of the synthesis of PREGS and which is far downstream of the function of a NMDA receptor. Even if **D6** notes that the processing of StAR is influenced by the stimulation of the NMDA receptor, a skilled person is aware of the fact that hundreds of other molecules are influenced by the NMDA receptor and thus, would not readily make the inference that every molecule being regulated by NMDA is linked to Alzheimer's disease. It would be undue burden for a person skilled in the art to scan all the molecules of the pathways connected with NMDA receptors, with neurosteroids and sulfated neurosteroids like PREGS and with cholesterol to look for a direct link to neuroprotection, for a direct association with Alzheimer's disease. Thus, a person skilled in the art having studied the documents cited above would not have a motivation to investigate just one out of hundreds of molecules discussed in the context with a neurodegenerative disorder without having a reasonable expectation of success.

2.2 –D3 discloses an antibody specific for the StAR protein and the use of said antibody in an immunoblot analysis with whole tissue extracts to examine if the protein StAR is at all present or not. The mere information about the existence of an antibody which can be used to detect a protein StAR and the information that said protein StAR is one out of hundreds of molecules in the NMDA receptor/Neurosteroid pathways would not obviously lead to the conclusion to establish a kit using said antibody to diagnose Alzheimer's disease. In the light of the argumentation as given above and in section V 2.1, claim 3 of the present application is inventive.

It is requested to confirm novelty, inventive step and industrial applicability of the present set of claims.

In regards to the IPEA's additional remarks, the applicant prefers to respond to the issues raised in later stages of a national/regional prosecution of the instant application, if necessary.

The Patent Attorney

(Dr. Meyers)

Enclosure: /

AMENDED CLAIMS

1. A method of diagnosing or prognosticating a neurodegenerative disease in a subject, or determining whether a subject is at increased risk of developing said disease, comprising determining a level and/or an activity of

(i) a transcription product of the gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a translation product of the gene coding for the steroidogenic acute regulatory protein , and/or

(iii) a fragment, or derivative, or variant of said transcription or translation product,

in a sample obtained from said subject and comparing said level and/or said activity to a reference value representing a known disease or health status, thereby diagnosing or prognosticating said neurodegenerative disease in said subject, or determining whether said subject is at increased risk of developing said neurodegenerative disease.

2. The method according to claim 1 wherein said neurodegenerative disease is Alzheimer's disease.

3. A kit for diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, in a subject, or determining the propensity or predisposition of a subject to develop such a disease by:

(i) detecting in a sample obtained from said subject a varied, or a similar or equal level, or activity, or both said level and said activity of a transcription product and/or of a translation product of a gene coding for the steroidogenic acute regulatory protein compared to a reference value representing a known health status, or representing a known disease status;

and said kit comprising:

a) at least one reagent which is selected from the group consisting of (i) reagents that selectively detect a transcription product of a gene coding for the steroidogenic acute regulatory protein, and (ii) reagents that selectively detect a translation product of a gene coding for the steroidogenic acute regulatory protein.

4. A modulator of an activity and/or of a level of at least one substance which is selected from the group consisting of

(i) the gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a transcription product of the gene coding for the steroidogenic acute regulatory protein, and/or

(iii) a translation product of the gene coding for the steroidogenic acute regulatory protein, and/or

(iv) a fragment, or derivative, or variant of (i) to (iii).

5. A recombinant, non-human animal comprising a non-native gene sequence coding for the steroidogenic acute regulatory protein, or a fragment, or a derivative, or a variant thereof, said animal being obtainable by:

(i) providing a gene targeting construct comprising said gene sequence and a selectable marker sequence, and

(ii) introducing said targeting construct into a stem cell of a non-human animal, and

(iii) introducing said non-human animal stem cell into a non-human embryo, and

(iv) transplanting said embryo into a pseudopregnant non-human animal, and

(v) allowing said embryo to develop to term, and

(vi) identifying a genetically altered non-human animal whose genome comprises a modification of said gene sequence in both alleles, and

(vii) breeding the genetically altered non-human animal of step (vi) to obtain a genetically altered non-human animal whose genome comprises a modification of said endogenous gene, wherein said disruption results in said non-human animal exhibiting a predisposition to developing symptoms of a neurodegenerative disease or related diseases or disorders.

6. An assay for screening for a modulator of neurodegenerative diseases, in particular Alzheimer's disease, or related diseases or disorders of one or more substances selected from the group consisting of

(i) the gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a transcription product of the gene coding for the steroidogenic acute regulatory protein, and/or

(iii) a translation product of the gene coding for the steroidogenic acute regulatory protein, and/or

(iv) a fragment, or derivative, or variant of (i) to (iii),

said method comprising:

(a) contacting a cell with a test compound;

(b) measuring the activity and/or level of one or more substances recited in (i) to (iv);

(c) measuring the activity and/or level of one or more substances recited in (i) to (iv) in a control cell not contacted with said test compound; and

(d) comparing the levels and/or activities of the substance in the cells of step (b) and (c), wherein an alteration in the activity and/or level of substances in the contacted cells indicates that the test compound is a modulator of said diseases or disorders.

7. A method of screening for a modulator of neurodegenerative diseases, in particular Alzheimer's disease, or related diseases or disorders of one or more substances selected from the group consisting of

(i) the gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a transcription product of the gene coding for the steroidogenic acute regulatory protein, and/or

(iii) a translation product of the gene coding for the steroidogenic acute regulatory protein, and/or

(v) a fragment, or derivative, or variant of (i) to (iii),

said method comprising:

(a) administering a test compound to a test animal which is predisposed to developing or has already developed symptoms of a neurodegenerative disease or related diseases or disorders in respect of the substances recited in (i) to (iv);

(b) measuring the activity and/or level of one or more substances recited in (i) to (iv);

(c) measuring the activity and/or level of one or more substances recited in (i) or (iv) in a matched control animal which is predisposed to developing or has already developed a neurodegenerative disease or related diseases or disorders in respect to the substances recited in (i) to (iv) and to which animal no such test compound has been administered;

(d) comparing the activity and/or level of the substance in the animals of step (b) and (c), wherein an alteration in the activity and/or level of substances in the test animal indicates that the test compound is a modulator of said diseases or disorders.

8. The method according to claim 7 wherein said test animal and/or said control animal is a recombinant animal which expresses the

steroidogenic acute regulatory protein, or a fragment, or a derivative, or a variant thereof, under the control of a transcriptional control element which is not the native steroidogenic acute regulatory protein gene transcriptional control element.

9. An assay for testing a compound, preferably for screening a plurality of compounds for inhibition of binding between a ligand and a translation product of the gene coding for the steroidogenic acute regulatory protein, or a fragment, or a derivative, or a variant thereof, said assay comprising the steps of:

(i) adding a liquid suspension of said translation product of the gene coding for the steroidogenic acute regulatory protein, or a fragment, or derivative, or variant thereof, to a plurality of containers;

(ii) adding a compound or a plurality of compounds to be screened for said inhibition to said plurality of containers;

(iii) adding a detectable, preferably a fluorescently labelled ligand to said containers;

(iv) incubating said translation product of the gene coding for the steroidogenic acute regulatory protein, or said fragment, or derivative, or variant thereof, and said compound or compounds, and said detectable, preferably fluorescently labelled ligand;

(v) measuring amounts of preferably fluorescence associated with said translation product of the gene coding for the steroidogenic acute regulatory protein, or with said fragment, or derivative, or variant thereof; and

(vi) determining the degree of inhibition by one or more of said compounds of binding of said ligand to said translation product of the gene coding for the steroidogenic acute regulatory protein, or said fragment, or derivative, or variant thereof.

10. Use of a protein molecule, said protein molecule being a translation product of the gene coding for the steroidogenic acute regulatory protein, SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, as a diagnostic target for detecting a neurodegenerative disease, preferably Alzheimer's disease.

11. Use of a protein molecule, said protein molecule being a translation product of the gene coding for the steroidogenic acute regulatory protein, SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, as a screening target for reagents or compounds preventing, or treating, or ameliorating a neurodegenerative disease, preferably Alzheimer's disease.

12. Use of an antibody specifically immunoreactive with an immunogen, wherein said immunogen is a translation product of the gene coding for the steroidogenic acute regulatory protein, SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, for detecting a pathological state of a cell in a sample obtained from a subject, comprising immunocytochemical staining of said cell with said antibody, wherein an altered degree of staining, or an altered staining pattern in said cell compared to a cell representing a known health status indicates a pathological state of said cell.

AMENDED CLAIMS

1. A method of diagnosing or prognosticating a neurodegenerative disease in a subject, or determining whether a subject is at increased risk of developing said disease, comprising determining a level and/or an activity of

(i) a transcription product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein , and/or

(iii) a fragment, or derivative, or variant of said transcription or translation product,

in a sample obtained from said subject and comparing said level and/or said activity to a reference value representing a known disease or health status, thereby diagnosing or prognosticating said neurodegenerative disease in said subject, or determining whether said subject is at increased risk of developing said neurodegenerative disease.

2. The method according to claim 1 wherein said neurodegenerative disease is Alzheimer's disease.

3. A kit for diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, in a subject, or determining the propensity or predisposition of a subject to develop such a disease by:~~, said kit comprising:~~

(i) detecting in a sample obtained from said subject a varied, or a similar or equal level, or activity, or both said level and said activity of a transcription product and/or of a translation product of a gene coding for the steroidogenic acute regulatory protein compared to a reference value representing a known health status, or representing a known disease status;

and said kit comprising:

a) at least one reagent which is selected from the group consisting of (i) reagents that selectively detect a transcription product of a gene coding for the steroidogenic acute regulatory protein, and (ii) reagents that

selectively detect a translation product of a gene coding for the steroidogenic acute regulatory protein.

~~(a)at least one reagent which is selected from the group consisting of (i) reagents that selectively detect a transcription product of the StAR gene and (ii) reagents that selectively detect a translation product of the StAR gene and~~

~~(b)an instruction for diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, or determining the propensity or predisposition of a subject to develop such a disease by (i) detecting a level, or an activity, or both said level and said activity, of said transcription product and/or said translation product of the StAR gene, in a sample from said subject; and (ii) diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, or determining the propensity or predisposition of said subject to develop such a disease, wherein a varied level, or activity, or both said level and said activity, of said transcription product and/or said translation product compared to a reference value representing a known health status; or a level, or activity, or both said level and said activity, of said transcription product and/or said translation product similar or equal to a reference value representing a known disease status indicates a diagnosis or prognosis of a neurodegenerative disease, in particular Alzheimer's disease, or an increased propensity or predisposition of developing such a disease.~~

4. A modulator of an activity and/or of a level of at least one substance which is selected from the group consisting of

(i) the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a transcription product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(iii) a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(iv) a fragment, or derivative, or variant of (i) to (iii).

5. A recombinant, non-human animal comprising a non-native gene sequence coding for ~~StAR~~the steroidogenic acute regulatory protein, or a fragment, or a derivative, or a variant thereof, said animal being obtainable by:

(i) providing a gene targeting construct comprising said gene sequence and a selectable marker sequence, and

(ii) introducing said targeting construct into a stem cell of a non-human animal, and

(iii) introducing said non-human animal stem cell into a non-human embryo, and

(iv) transplanting said embryo into a pseudopregnant non-human animal, and

(v) allowing said embryo to develop to term, and

(vi) identifying a genetically altered non-human animal whose genome comprises a modification of said gene sequence in both alleles, and

(vii) breeding the genetically altered non-human animal of step (vi) to obtain a genetically altered non-human animal whose genome comprises a modification of said endogenous gene, wherein said disruption results in said non-human animal exhibiting a predisposition to developing symptoms of a neurodegenerative disease or related diseases or disorders.

6. An assay for screening for a modulator of neurodegenerative diseases, in particular Alzheimer's disease, or related diseases or disorders of one or more substances selected from the group consisting of

(i) the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a transcription product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(iii) a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(iv) a fragment, or derivative, or variant of (i) to (iii),

said method comprising:

(a) contacting a cell with a test compound;

(b) measuring the activity and/or level of one or more substances recited in (i) to (iv);

(c) measuring the activity and/or level of one or more substances recited in (i) to (iv) in a control cell not contacted with said test compound; and

(d) comparing the levels and/or activities of the substance in the cells of step (b) and (c), wherein an alteration in the activity and/or level of substances in the contacted cells indicates that the test compound is a modulator of said diseases or disorders.

7. A method of screening for a modulator of neurodegenerative diseases, in particular Alzheimer's disease, or related diseases or disorders of one or more substances selected from the group consisting of

(i) the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(ii) a transcription product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(iii) a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, and/or

(v) a fragment, or derivative, or variant of (i) to (iii),

said method comprising:

(a) administering a test compound to a test animal which is predisposed to developing or has already developed symptoms of a neurodegenerative disease or related diseases or disorders in respect of the substances recited in (i) to (iv);

(b) measuring the activity and/or level of one or more substances recited in (i) to (iv);

(c) measuring the activity and/or level of one or more substances recited in (i) or (iv) in a matched control animal which is predisposed to developing or has already developed a neurodegenerative disease or related diseases or disorders in respect to the substances recited in (i) to (iv) and to which animal no such test compound has been administered;

(d) comparing the activity and/or level of the substance in the animals of step (b) and (c), wherein an alteration in the activity and/or level

of substances in the test animal indicates that the test compound is a modulator of said diseases or disorders.

8. The method according to claim 7 wherein said test animal and/or said control animal is a recombinant animal which expresses ~~StAR~~the steroidogenic acute regulatory protein, or a fragment, or a derivative, or a variant thereof, under the control of a transcriptional control element which is not the native ~~StAR~~ steroidogenic acute regulatory protein gene transcriptional control element.

9. An assay for testing a compound, preferably for screening a plurality of compounds for inhibition of binding between a ligand and a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, or a fragment, or a derivative, or a variant thereof, said assay comprising the steps of:

(i) adding a liquid suspension of said translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, or a fragment, or derivative, or variant thereof, to a plurality of containers;

(ii) adding a compound or a plurality of compounds to be screened for said inhibition to said plurality of containers;

(iii) adding a detectable, preferably a fluorescently labelled ligand to said containers;

(iv) incubating said translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, or said fragment, or derivative, or variant thereof, and said compound or compounds, and said detectable, preferably fluorescently labelled ligand;

(v) measuring amounts of preferably fluorescence associated with said translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, or with said fragment, or derivative, or variant thereof; and

(vi) determining the degree of inhibition by one or more of said compounds of binding of said ligand to said translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, or said fragment, or derivative, or variant thereof.

10. Use of a~~A~~ protein molecule, said protein molecule being a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, ~~for use~~ as a diagnostic target for detecting a neurodegenerative disease, preferably Alzheimer's disease.

11. Use of a ~~A~~ protein molecule, said protein molecule being a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, ~~for use~~ as a screening target for reagents or compounds preventing, or treating, or ameliorating a neurodegenerative disease, preferably Alzheimer's disease.

12. Use of an antibody specifically immunoreactive with an immunogen, wherein said immunogen is a translation product of the ~~StAR~~ gene coding for the steroidogenic acute regulatory protein, SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, for detecting a pathological state of a cell in a sample obtained from a subject, comprising immunocytochemical staining of said cell with said antibody, wherein an altered degree of staining, or an altered staining pattern in said cell compared to a cell representing a known health status indicates a pathological state of said cell.